

Application No. 10/064,887  
Docket No. 13DV-14039  
Amendment dated February 2, 2004  
Reply to Office Action of October 3, 2003

### REMARKS

In the Office Action, the Examiner reviewed claims 1-29 of the above-identified US Patent Application, with the result that claims 20-29 were withdrawn from consideration due to a restriction requirement, the abstract was objected to, and claims 1-20 were rejected under 35 USC §103 and under the judicially-created doctrine of obviousness-type double patenting. In response, Applicants have amended the specification and claims as set forth above. More particularly:

The title of the invention has been amended at page 1 of the specification so as to be more descriptive of the invention recited in the elected claims.

The abstract has been amended to be more descriptive of the invention recited in the elected claims and to address a clerical error.

The specification has been amended to update the status of U.S. Patent Application Serial No. 09/833,446 to Rigney et al., which issued as U.S. Patent No. 6,586,115 after the filing of the present application.

Independent claims 1 and 10 have been amended to specify that the electron beam (26) is projected on the evaporation source/ingot (10) to simultaneously melt oxide compounds within the source/ingot (10). Support for these amendments can be found in Applicants' specification at paragraph [0021].

Independent claim 1 has also been amended to specify that the coating (32) deposited during the subsequent phase has a substantially uniform distribution of the at

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least one oxide compound. Support for this amendment can be found in Applicants' specification at paragraph [0024] and Figure 4.

Independent claim 10 has also been amended to specify that the vapor cloud (34) continuously contacts and condenses on the component (30) during forming of the thermal barrier coating (32) (after the relative amount of the third oxide compound within the vapor cloud (34) has dropped and stabilized).

Claims 21-29 have been canceled in view of the above-noted restriction requirement, for the purpose of reducing and simplifying the issues remaining in the examination of Applicants' application.

Applicants believe that the above amendments do not present new matter. Favorable reconsideration and allowance of remaining claims 1-20 are respectfully requested in view of the above amendments and the following remarks.

#### **Restriction Requirement**

In the Office Action, the Examiner required that Applicants affirm an election under 35 USC §121 between claims 1-20 (Group I) drawn to a process and claims 21-29 (Group II) drawn to an apparatus. During a telephone interview at the Examiner's initiation on September 5, 2003, Applicants' representative provisionally elected with traverse to prosecute Group I, claims 1-20. Applicants hereby affirm the election to prosecute claims 1-20 on the merits. As indicated above, the unelected claims of Group

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It have been canceled by Applicants.

### **Priority**

The Examiner noted that Applicants had not yet filed a certified copy of the Ukrainian application on which foreign priority is claimed. In response, Applicants are forwarding under separate cover the required certified copy.

### **Objection to the Specification**

The Examiner objected to the specification, stating that "the claimed invention is directed to a method. The examiner suggests amending the abstract to reflect same." In response, Applicants believe they have revised the title and Abstract in accordance with the Examiner's suggestion, and therefore request withdrawal of the objection.

### **Rejection under 35 USC §103**

Independent claims 1 and 10 and their dependent claims 2-9 and 11-20 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,346,301 to Beele et al. (Beele) or U.S. Patent No. 6,187,453 to Maloney in view of U.S. Patent No. 6,251,504 to Jaslier et al. (Jaslier). Applicants respectfully traverse this rejection in view of the following comments.

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Applicants' invention is directed to a process for depositing on a component (30) a ceramic coating (32) formed of multiple different oxide compounds, at least one of which has a vapor pressure that is higher than the other oxide compounds in the coating (32). The process involves the use of a high energy beam (26) to evaporate an evaporation source (10) that contains the multiple different oxide compounds, including the compound having the higher vapor pressure. The high energy beam (26) simultaneously melts the oxide compounds and forms a vapor cloud (34) of the oxide compounds. However, the vapor cloud (34) is initially prevented from contacting and condensing on the component (30). According to the invention, during the initial phase the vapor cloud (34) contains a higher relative amount of the high vapor pressure oxide compound than is present in the evaporation source (10), but this elevated level eventually decreases to something approximately equal to the relative amount of the high vapor pressure oxide compound in the evaporation source (10). Only during this later phase is the vapor cloud allowed to contact and condense on the component (30) to form the coating (32).

Under the §103 rejection, the Examiner explained that both Beele and Maloney disclose a method of producing a thermal barrier coating by evaporating a solid evaporation source with an electron beam, and then allowing the evaporant to condense on a substrate surface to form the coating. The Examiner acknowledged that Beele and Maloney fail to specifically teach that their targeted substrates are suspended,

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but noted that doing so would be obvious to one skilled in the art. Finally, the Examiner cited Jaslier for disclosing the use of a shutter for an evaporation source, and concluded that it would have been obvious to use Jaslier's shutter in the process of Beele or Maloney "with the expectation of obtaining better control of the evaporation process."

Applicants respectfully request reconsideration of this rejection in view of the following remarks.

As stated in MPEP §706, the standard of patentability was stated by the Supreme Court in *Graham v. John Deere*, 148 USPQ 459 (1966), as follows:

Under Section 103, the scope and the content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved.

The Examiner explanation for concluding that Applicants' invention is obvious over Beele or Maloney in view of Jaslier did not explain how any of these references disclose, teach or suggest a key aspect of Applicants' invention, namely, initially preventing a vapor cloud (34) from contacting and condensing on a component (30) while the vapor cloud (34) contains a higher relative amount of an oxide compound than the relative amount of the oxide compound in the evaporation source (10), and then eventually allowing the vapor cloud (34) to contact and condense on the component (30) to form the coating (32) once the relative amount of the oxide compound has



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decreased to something approximately equal to its relative amount in the evaporation source (10). Applicants cannot find any suggestion for such a process step in the prior art references cited by the Examiner. At best, Beele discloses a "shading means 21" that is pulled out of the way at some unspecified time, and Maloney discloses sequentially evaporating oxides from different evaporation sources contained in separate channels 34 and 36 of a crucible 30. Jaslier's shutter, which the Examiner cites as motivation for modifying the process of Beele or Maloney "with the expectation of obtaining better control of the evaporation process," actually teaches away from the use of a shutter to the extent that a shutter is said to not achieve the effect sought by Jaslier (column 6, line 65-column 7, line 1). In any event, Jaslier teaches that the desired effect is intermittent regermination of a ceramic layer throughout the coating process, resulting in a coating with discrete layers Z1, Z2, Z3, etc.

In view of the above, differences between the prior art and Applicants' invention include the fact that the prior art does not disclose or suggest Applicants' process that prevents a vapor cloud from contacting and condensing on a component while the vapor cloud contains relative amounts of oxide compounds that differ from the relative amounts of the oxide compounds in an evaporation source. While Maloney recognizes the problem solved by Applicants (ceramic coatings whose constituent oxides deposit at different rates), Maloney's solution is completely different from Applicants - Maloney teaches separating the different oxide constituents and then

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adjusting the amount of time that an electron beam is projected onto the separated constituents (column 6, lines 53-61). The possibility of achieving a ceramic coating of a desired composition by evaporating a single source containing different oxide constituents, but then delaying the onset of deposition until the vapor cloud composition is stabilized, is found entirely within Applicants' specification.

For all of the above reasons, Applicants believe that Beele, Maloney and Jaslier do not fulfil the requirements set forth in *Graham v. John Deere*, and respectfully request withdrawal of the rejection to the claims under 35 USC §103(a).

#### **Double Patenting Rejection**

The Examiner rejected claims 1-20 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 6,571,857 to Darolia et al. (Darolia)<sup>1</sup>. Applicants hereby acknowledge that the present application and Darolia are commonly assigned.

In characterizing the rejection, the Examiner stated that

Although the conflicting claims are not identical, they are not patentably distinct from each other because the specification of materials is an obvious variation.

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<sup>1</sup> Applicants note that Darolia contains only twenty-four claims, and not twenty-five as cited by the Examiner.

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Under MPEP §804, Section II.B.1.(a), if Applicants' claims can be shown to be unobvious over the claims cited from Darolia, issuance of a patent covering Applicants' claims would not result in an unjustified timewise extension of the right to exclude - the public policy that serves as the basis for judicially-created doctrine of obviousness-type double patenting rejections. Applicants believe that their claimed process is not obvious in view of the process recited in Darolia's claims, because nothing in Darolia's claims teaches or suggests Applicants' process of preventing a vapor cloud from contacting and condensing on a component while the vapor cloud contains a relative amount of an oxide compound that differs from the relative amount of the oxide compound in the evaporation source from which the vapor cloud is produced.

In view of the above, Applicants respectfully request withdrawal of the judicially-created double patenting rejection of Applicants' claims in view of Darolia.

### Closing

Applicants believe that all issues outstanding from the Office Action have been addressed, and that the claims define patentable novelty over all the references, alone or in combination, of record. It is therefore respectfully requested that this patent application be given favorable reconsideration.



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Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

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Attachments: Fee Transmittal form; Substitute Abstract